

Interactive comment on “The importance of plant water use on evapotranspiration covers in semi-arid Australia” by A. Schneider et al.

Anonymous Referee #2

Received and published: 12 December 2012

The manuscript presents a study on evapotranspiration from a mine-waste cover system. The manuscript is well written and structured, and it addresses a problem of interest to the audience of this journal. However, many aspects of the manuscript are not very clear and most of the results are speculative, as explained more in detail below.

General comments

- The Authors present a very limited amount of data. Evapotranspiration depends on many variables and it varies in time and space. The data presented refer to few days before and after a single artificial rainfall event and thus are not sufficient to lead to conclusions about the water use of the two vegetation species analysed; transpiration

results from meteorological conditions, soil water content and the duration of periods between rainfall events. These variables are not accounted in the experiment presented. Likewise, the single bare soil measurement is not enough to draw general conclusions on bare soil evaporation.

- The calculation of transpiration for individual plants is based on the area of bare soil within a chamber. I can see two problems with this estimation. 1) As shown in Fig. 1, the vegetation partially covers the ground so that it is difficult to distinguish between vegetated and bare soil. How is the contribution of the bare soil under the vegetation canopy accounted for? What is the effect of the shadow? 2) The evaporation from bare soil is calculated using a single measure from the chamber installed on bare soil. What is the error associated with this estimate? The bare soil near plants might be wetter than the bare soil where the bare-soil chamber is installed because of shade and maybe hydraulic redistribution. How are these differences accounted for?
- The limited amount of data makes the extension to the plot rather arbitrary. Likewise, the discussion section appears very speculative and quite vague. Many of the statements in the discussions are reported as results of general validity, while they might be simply due to local characteristics of the plots studied in the experiment.

Some specific comments and suggestions

- Title: too general and vague. I would change it.
- Page 11914, lines 10-15: I would specify the years used to calculate the long-term averages of rainfall and temperatures.
- Page 11914, line 20: the residual moisture should be larger than zero.
- Page 11915, lines 15-16: the two species are defined here using the short notation Sen and Scl. However, these are not used throughout the manuscript, but the full name is always reported. Please, choose one notation and be consistent.
- Page 11915, lines 20-23: how was 17 mm chosen? What area has been watered?

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From Fig. 3, soil moisture goes from about 0.02 to about 0.13-0.16 in the first 50 mm of soil. A lot of the water thus infiltrated below 50 mm. What is the meaning of reporting the measurements in Fig. 3? How do they relate to the results in Fig. 4?

- Page 11915, line 25-26: how was 10 minutes chosen? How are different evapotranspiration rates affecting the quality of the measurements? I would provide more details on the testing of the chambers.
- Page 11917, line 2: in the environment described, G is unlikely to be zero.
- Eq. 6: the rationale behind this equation should be better explained. What is the effect of shades, different soil moisture and temperature, and different wind conditions on bare soil evaporation?
- Page 11920, line 1: it is not clear how morning and afternoon are defined. Which hours of the day are used?
- Page 11921, line 2: I don't think Rodriguez-Iturbe et al. (2001) define evapotranspiration as the most critical ecohydrological variables, since the focus of their study was soil moisture, which was considered as the key variable.
- Page 11921, lines 19-29: these are general speculations not based on the results of the manuscript.
- Figures 1 and 2 are not useful.
- Figure 4: I would move the legend in the frame and make the whole graph larger.
- Figure 5: I would report ET in mm/hour.

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